PART I - ADMINISTRATIVE

Section 1. General administrative information

Title of project

Johnson Creek Artificial Propagation Enhancement Project

BPA project number: 9604300
Contract renewal date (mm/yyyy): 1/2000 ☐ **Multiple actions?**

Business name of agency, institution or organization requesting funding
Nez Perce Tribe - Department of Fisheries Resources Manangement

Business acronym (if appropriate) NPT

Proposal contact person or principal investigator:

Name	John S. Gebhards/ Jason L.Vogel
Mailing Address	P. O. Box 1942
City, ST Zip	McCall, ID 83638
Phone	(208) 634-5290
Fax	(208) 634-4097
Email address	johng@nezperce.org/ jasonv@nezperce.org

NPPC Program Measure Number(s) which this project addresses
4.2, 7.1b, 7.2d.1, 7.2d.3, 7.4a.1, 7.4a.2., 7.3b, 7.3b.2, 7.4c.1, 7.4d, 7.4e, 7.4f, 7.4o, 7.4o.1

FWS/NMFS Biological Opinion Number(s) which this project addresses
NMFS ESA Section 10 Permits #1164 and #1147, FWS Sec. 7 BiOp 501.1100, 1-4-98-F4 (bull trout), ESA Section 10 Application (Lothrop 1998), NMFS Sec. 7 BiOp - Issuance of Section 10 Direct Take Permit for JCAPE, 7-16-98.

Other planning document references
Snake River Recovery Plan: 4.1,4.4; Wy-Kan-Ush-Mi Wa-Kush-Wit: Volume I: 5B 14-22, 5D 1-4, Volume II: 2 118-127; Salmon River Subbasin Plan: Objective 5.

Short description
Implement and monitor supplementation program to recover native summer chinook salmon in Johnson Creek. Construct facilities for adult collection and holding, NATURE's concept rearing, and smolt acclimation.

Target species
Summer Chinook Salmon (Oncorhynchus tshawytscha)

Section 2. Sorting and evaluation

Subbasin
Salmon River

Evaluation Process Sort

CBFWA caucus	Special evaluation process	ISRP project type
Mark one or more caucus	If your project fits either of these processes, mark one or both	Mark one or more categories
☒ Anadromous fish ☐ Resident fish ☐ Wildlife	☐ Multi-year (milestone-based evaluation) ☐ Watershed project evaluation	☐ Watershed councils/model watersheds ☐ Information dissemination ☒ Operation & maintenance ☒ New construction ☒ Research & monitoring ☐ Implementation & management ☐ Wildlife habitat acquisitions

Section 3. Relationships to other Bonneville projects

Umbrella / sub-proposal relationships. List umbrella project first.

Project #	Project title/description

Other dependent or critically-related projects

Project #	Project title/description	Nature of relationship
8909800	Idaho Salmon Supplementation (IDFG)	Long Term Supplementation Evaluation. Will utilize 9604300 production and evaluation data in a system-wide evaluation.
8909802	Salmon Supplementation Studies in ID (NPT)	Long Term Supplementation Evaluation. Will utilize 9604300 production and evaluation data in a system-wide evaluation.
9703800	Listed Stock Gamete Preservation (NPT)	Long Term Gamete Preservation

Section 4. Objectives, tasks and schedules

Past accomplishments

Year	Accomplishment	Met biological objectives?
1997	Development of the Johnson Creek Summer Chinook Salmon Supplementation Program	
1997	Collected baseline information on environmental conditions on Johnson Creek	Yes - objective 3a was met.
1998	Initiated preliminary design analysis	
1998	Collected baseline information on environmental conditions on Johnson Creek	Yes - objective 3a was met.
1998	Determined abundance and selected life history characteristics/patterns of juvenile summer	Yes - objectives 4a,b,c,d were met.

	chinook salmon.	
1998	Determined abundance and spawning distribution/success of upstream migrant adult summer chinook salmon.	Yes - objectives 6a,b,c,d,e were met.
1998	Operation of the adult weir (July through September) resulted in the capture of 114 adult summer chinook. There were 54 adults utilized as broodstock.	Yes - objectives 5b,c,d,e,f were met.
1998	Monitor and evaluate operation of adult collection and holding facility for adverse impacts to summer chinook salmon.	Yes - objective 8a was met.
1998	Prepared quarterly reports and presented results	

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Johnson Creek Artificial Propagation Enhancement (JCAPE) Project coordination	a	Participate in the production planning and coordinate with co-managers to facilitate project objectives.
1		b	Participate in facility design and development to provide physical requirements of the biological needs for project tasks.
1		c	Complete necessary environmental and cultural resource reviews on project activites.
1		d	Modify Annual Operations Plan (AOP) to address production goals, broodstock acquisition, spawning protocols, incubation strategies, rearing programs tofacility operations and maintenance.
1		e	Obtain appropriate permits for all project activities as needed for project implementation (NMFS/FWS/USFS).
1		f	Provide informational reports to agencies and public on project activities and present findings at Annual BPA/CBFWA Project Review and other forums (i.e. AFS, NAFWS, etc.). Prepare BPA quarterly and annual reports.
2	JCAPE Facility Construction Implementation	a	Complete final engineering design that meets the needs of the JCAPE project.
2		b	Award construction contract and begin construction of facilities on Johnson Creek and the McCall Fish Hatchery.
2		c	Oversee construction activities for JCAPE facilities on Johnson Creek and the McCall Fish Hatchery.
3	Collect baseline information on environmental conditions in Johnson Creek, with special attention to smolt emigration and adult spawning migration	a	Monitor a constant recording thermograph and stage gauge to collect water temperature information near the adult trapping, emigrant trapping, smolt

	periods.		acclimation, and release facility and permanent gauging station.
4	Determine abundance, selected life history characteristics/patterns, and spatial distribution of juvenile summer chinook salmon pre-, during, and post-supplementation of indigenous summer chinook salmon.	a	Operate juvenile chinook salmon emigration trapping trap to obtain timing, estimate abundance, and life history characteristics.
4		b	PIT tag natural parr, pre-smolts and smolts for estimating survival, emigration timing, and travel times to Lower Granite, Little Goose, Lower Monumental, and McNary dams.
4		c	Conduct juvenile summer parr PIT tagging (PIT tag at least 700 juvenile summer parr)with IDFG to obtain summer parr survival estimates and movement patterns.
4		d	Assist IDFG snorkel, general parr monitoring sites (GPM), for presence/absence and general trend information.
5	Adult Salmon Collection, Holding and Spawning	a	Install, operate, and maintain a portable adult salmon weir/trap on Johnson Creek for broodstock collection.
5		b	Collect broodstock and release fish above weir for natural spawning in accordance with JCAPE Broodstock Management Plan and ESA permits.
5		c	Hold adult salmon until ready for spawning.
5		d	Spawn Johnson Creek broodstock in accordance with JCAPE Broodstock Management Plan.
5		e	Collect disease, genetic, tag, age, and size data from spawned adult salmon.
6	Determine abundance and spawning distribution/success of upstream migrant jack and adult anadromous summer chinook salmon pre-, during, and post-supplementation of indigenous summer chinook salmon in the Johnson Creek system.	a	Evaluate the portable weir/trap facility during spawning migration for enumeration of upstream migrant summer chinook salmon.
6		b	Collect run timing information from adults trapped.
6		c	Collect length, sex, physical characteristics, tissue for genetic analysis, spawning maturation, scales, otoliths, percent spawned, snouts from CWT tagged fish, and record marks on all carcasses, and mark all adults released upstream of the weir.
6		d	Estimate efficiency and total escapement above the weir, utilizing a mark-recapture study comparing marked to unmarked carcasses and determine hatchery to wild fish ratios and fish per redd ratio.

6		e	Conduct intensive multiple count spawning ground surveys to enumerate redds, live fish, and carcasses and determine relative abundance of spawners.
7	Determine and monitor genetic characteristics/patterns, of supplementation vs. natural summer chinook salmon pre-, during, and post-supplementation of indegenous summer chinook salmon.	a	Conduct genetic analysis of Johnson Creek summer chinook population in order to determine within-population genetic variability.
8	Evaluate operation of adult collection and holding facility for adverse impacts to resident and/or anadromous fish populations in Johnson Creek.	a	Monitor upstream and downstream of the weir in regular intervals with multiple ground counts and snorkeling to enumerate redds, live fish, and carcasses of salmon that may be impeded by the presence of the adult weir.
9	Egg Incubation and Juvenile Rearing	a	Begin egg incubation at the McCall Fish Hatchery.
9		b	Implement egg segregation for disease, until pathology results are finalized.
9		c	Continue egg segregation or egg culling as recommended by pathologists.
9		d	Begin initial fry set out and feeding as determined by fish culturist.
9		e	Transfer juvenile fish to outside rearing ponds as determined by fish culturist.
9		f	Coordinate and conduct mass fish marking when fish achieve appropriate size for marking.
10	Monitor smolt production in the hatchery to evaluate health status, growth rates, and condition factors to compare supplementation fish with natural fish.	a	Perform standard health and pathological tests coordinated with ongoing evaluations conducted by Idaho Fish & Game and U. S. Fish & Wildlife Service.
11	Smolt Acclimation and Release	a	Activate acclimation channels prior to fish transfer.
11		b	Transfer smolts from McCall Fish Hatchery to acclimation channels on Johnson Creek.
11		c	Acclimate smolts on Johnson Creek for a minimum of 21 days.
11		d	Begin volitional release of smolts after initial 21 day acclimation period.
11		e	Release remaining smolts from acclimation channels after 45 days from initial transfer to acclimation channels.
12	Determine effectiveness of acclimation of hatchery summer chinook salmon to increase the overall population of Johnson Creek summer chinook salmon.	a	Implement marking program (CWT and VIE tagging) of hatchery chinook juveniles to have a definative internal and external mark to compare survival estimates between hatchery and wild chinook in the Johnson Creek system.
12		b	PIT tag a portion of Johnson Creek hatchery

			pre-smolts per brood year for estimating survival, emigration timing, and travel times to Lower Granite, Little Goose, Lower Monumental, and McNary dams.
12		c	Compare timing, estimated numbers, and life history characteristics of hatchery juvenile summer chinook salmon compared to wild summer chinook salmon captured in emigrant traps (objective 4, task a).

Objective schedules and costs

Obj #	Start date mm/yyyy	End date mm/yyyy	Measureable biological objective(s)	Milestone	FY2000 Cost %
1	1/1996	12/2024			1.65%
2	1/1998	12/2003			75.00%
3	1/1998	12/2024	Collection of environmental data		0.60%
4	1/1998	2/2029	Collection of biological data from remnant population		2.80%
5	1/1998	12/2023	Collection of adults for broodstock		2.50%
6	1/1998	12/2029	Collection of biological data from wild and supplemented fish		2.35%
7	1/1998	12/2029	Utilize tissue samples from adults for baseline genetic monitoring		1.10%
8	1/1998	12/2029	Determine effectiveness of adult collection facility		1.10%
9	1/1998	12/2025	Egg incubation and juvenile rearing		7.00%
10	1/1998	12/2029	Collection of biological data from juvenile supplementation fish		0.60%
11	3/2000	4/2025	Acclimation and release of juvenile smolts	First smolt release will occur in 2000.	2.50%
12	10/1999	10/2029	Evaluation of the acclimation and release of juvenile smolts		2.80%
				Total	100.00%

Schedule constraints

We assume that improvements in mainstem passage and flows will allow for increased smolt-to-adult survival. Without this, our efforts will be negated. Availability of salmon in 2000 may change the focus of the project to a captive broodstock program.

Completion date

Supplementation began in 1998 with an anticipated completion date of 2023 (the supplementation program is planned for 5 full salmon generations or 25 years). The M&E program will continue until the supplementation program is completed.

Section 5. Budget

FY99 project budget (BPA obligated): $1,300,000

FY2000 budget by line item

Item	Note	% of total	FY2000
Personnel	Suppl. 165,640 + M&E 110,771 (6 permanent and 6 seasonal staff).	%10	276,411
Fringe benefits	Suppl. 36,918 + M&E 23,569 (24.0% for Full-time employees 14.0% for Temporary employees).	%2	60,487
Supplies, materials, non-expendable property	Suppl. 17,150 + M&E 11,580	%1	28,730
Operations & maintenance	Suppl. 48,321 + M&E 16,852	%2	65,173
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	Suppl. 1,910,000	%69	1,929,733
NEPA costs	Suppl. 15,000	%1	15,000
Construction-related support	Suppl. 142,500	%5	142,500
PIT tags	# of tags: 18,000	%2	52,200
Travel	Suppl. 43,726 + M&E 25,430 (Includes vehicles, per diem, airfare, etc.)	%2	69,156
Indirect costs	Suppl. 66,812 + M&E 43,098 (22.9% of everything except subcontractor and PIT Tags).	%4	109,910
Subcontractor	Suppl. 16,200 + M&E 34,500	%2	50,700
Other	Suppl. + M&E	%0	
		TOTAL BPA FY2000 BUDGET REQUEST	$2,800,000

Cost sharing

Organization	Item or service provided	% total project cost (incl. BPA)	Amount ($)
		%0	
		%0	
		%0	
		%0	
		Total project cost (including BPA portion)	$2,800,000

Outyear costs

	FY2001	FY02	FY03	FY04
Total budget	$725,000	$735,000	$745,000	$755,000

Section 6. References

Watershed?	Reference
☐	Blankenship, H.L. 1990. Effects of time and fish size on coded wire tag loss from chinook and coho salmon. American Fisheries Society Symposium 7:237-243.
☐	Cuenco, M.L, T.W.H. Backman, and P.R. Mundy. 1993. The use of supplementation to aid in natural stock restoration. In, Genetic Conservation of Salmonid Fishes, J.G., Cloud and G.H. Thorgaard, eds. Plenum Press, New York.
☐	Daniel, M.D. and J.S. Gebhards. 1998. Johnson Creek Artificial Propagation Enhancement Project's Annual Operations Plan. Nez Perce Tribe. McCall, Idaho.
☐	FishPro. 1998. Program Verification - Biologiccal Criteria (Version 2). Johnson Creek Artificial Propagation Enhancement Project. Sept. 30, 1998. Prepared for Bonneville Power Administration and Nez Perce Tribe.
☐	Frederick, J.L. 1997. Evaluation of fluorescent elastomer injection as a method for marking small fish. Bulletin of Marine Science 61(2):399-408.
☐	Haw, F., P.K. Bergman, R.A. Fralick, R.M. Buckley, and H.L. Blankenship. 1990. Visible implanted fish tag. American Fisheries Society Symposium 7:311-315.
☐	IHOT (Integrated Hatchery Operations Team). 1995. Policies and Procedures from Columbia River Basin Anadromous Salmonid Hatcheries. Bonneville Power Administration Report 92-043. Portland, OR.
☐	Kincaid, H.L., and G.T. Calkins. 1992. Retention of visible implant tags in lake trout and Atlantic salmon. The Progressive Fish-Culturist 54:163-170.
☐	Krebs, C.J. 1989. Ecological Methodology. Harper Collins Publishers. Pages. 16-30.
☐	Kucera, P.A. 1998. Nez Perce Tribe Vision of the Future for Chinook Salmon Management in the South Fork Salmon River. In, Lower Snake River Compensation Plan Status Review Symposium. USFWS, Boise, ID. Feb. 3, 4, and 5, 1998.
☐	Lothrop, R.C. 1998. Application for a permit to enhance the propagation or survival of endangered South Fork Salmon River subbasin summer chinook Oncorhynchus tshawytscha under the Endangered Species Act of 1973 Dated March 23, 1998.
☐	Mavros, W.V., J.S. Gebhards, and M.D. Daniel. In Preparation. Johnson Creek Artificial Propagation Enhancement Project's Broodstock Management Plan. Nez Perce Tribe. McCall, Idaho.
☐	Maynard, D.J., T.A. Flagg, and C.V.W. Mahnken. 1996. Development of a natural rearing system to improve supplemental fish quality, 1991-1995. Progress Report prepared for Bonneville Power Administration. Project No. 91-055.Contract No. DE-A179-91BP2061.
☐	NMFS (National Marine Fisheries Service). 1995. Snake River Salmon Recovery Plan. National Marine Fisheries Service, Portland, OR.
☐	NPPC (Northwest Power Planning Council). 1994. Columbia River Basin Fish and Wildlife Program. Northwest Power Planning Council. Portland, OR.
☐	PMFC (Pacific Marine Fisheries Commission). 1983. Coded-wire tagging procedures for Pacific salmonids. PMFC, Portland, Oregon.
☐	RASP (Regional Asessment of Supplementation Project). 1992. Supplementation in the Columbia Basin. Part I - IV. RASP Summary Report Series. Bonneville Power Administration, Portland, OR.
☐	Schwartzberg, M. 1987. Columbia River Salmon Stock Identification Project for Stocks Originating Above Bonneville Dam. Field Operations Guide. Technical Report 87-1. CRITFC.
☐	Smith, S.G., J.R. Skalski, J.W. Schlechte, A. Hoffmann and V.Cassen. 1994. SURPH.1 Manual. Statistical survival analysis of fish and wildlife tagging studies. Report to Bonneville Power Administration. Contract DE-B179-90BP02341, Project 89-107. 268 p.
☐	SRSRT (Snake River Salmon Recovery Team). 1994. Final recommendations to the National Marine Fisheries Service, Portland, Oregon.
☐	Stelle, William. 1996. Letter to John Etchart, Chairman, Northwest Power Planning Council. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. Seattle, WA. March 12, 1996.
☐	Steward, C.R. 1996. Monitoring and Evaluation Plan for the Nez Perce Tribal Hatchery. Nez Perce Tribe Department of Fisheries Resources Management, Lapwai, ID. Prepared for

	the U.S. Department of Energy, B.P. A. Contract No. 87B136809, Pr. No 83-350.
☐	Vogel J.L., Harbeck, J., and Hesse, J.A. 1998. Monitoring and Evaluation Plan for the Johnson Creek Artificial Propagation Enhancement Program. Nez Perce Tribe. McCall, Idaho.
☐	Waples, R.S., O.W. Johnson, P.B. Aebersold, C.K. Shiflett, D.M. VanDoornik, D.J. Teel, and A.E. Cook.1993. A genetic monitoing and evaluation program for supplemented populations of salmon and steelhead in the Snake River Basin. Contract DE-A179-89BP0011.
☐	Wy-Kan-Ush-Mi Wa-Kush-Wit, Spirit of the Salmon. 1995. The Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs and Yakim Tribes. Columbia River Intertribal Fish Commission, Portland, OR.

PART II - NARRATIVE

Section 7. Abstract

This project is a small-scale production initiative designed to increase survival of a weak but recoverable spawning aggregate of summer chinook salmon. The goal of this project is to prevent the extirpation of the ESA listed Johnson Creek summer chinook and begin it=s recovery through supplementation. We intend to achieve this goal by rearing up to 300,000 chinook salmon smolts with acclimated releases back into Johnson Creek to return a minimum adult spawner escapement of 250-300 adults. Supplementation under this project is planned for a minimum of 5 full salmon generations or 25 years.

Overall, the project will implement a supplementation program utilizing NATURE=s concepts in rearing and acclimated releases. At extremely low adult escapement (less than 15 pairs) other supplementation initiatives such as captive broodstock and cryopreservation will be utilized. Low capital techniques for holding adults, acclimating juveniles, and improvements to an existing artificial production hatchery will be used to produce smolts and/or other approaches as necessary to increase this population.

We will implement a monitoring and evaluation plan to evaluate the supplementation program. This program will evaluate the benefits/drawbacks of NATURE's concepts in rearing and acclimated releases of juvenile chinook salmon smolts. This program, initiated prior to the first releases of supplemented fish, has been collecting baseline life-history characteristic information, to examine survival of the wild fish in Johnson Creek.

Section 8. Project description

a. Technical and/or scientific background

Johnson Creek, a tributary in the South Fork Salmon River subbasin, is located in the Central Idaho mountains. This spawning aggregate has experienced significant decline in returning adult numbers over the past five decades. Escapement levels in Johnson Creek have declined from a high of 486 redds in 1960 to a low of five (5) redds observed in 1995. Recruit to spawner values for Johnson Creek from 1985 to 1992 (after PATH analysis) show only two (2) years with a recruitment above the replacement value of one (Kucera 1998). The Johnson Creek spawning aggregate in in significant decline, at low levels of abundance and high demographic risk of extirpation. Snake River chinook salmon are listed as an threatened under the Endangered Species Act (ESA). Provisional adult salmon escapement objectives indicate that Johnson Creek could support 1,681 fish (SRSRT 1994). Captive broodstock and supplementation programs for Snake River spring/summer chinook are supported by recommendations in the Snake River Recovery Team's report (SRSRT 1994), NMFS (1995) draft recovery plan, and the Northwest Power Planning Council's Fish and Wildlife Program (NPPC 1994). The NMFS draft recovery plan states, "captive broodstock and supplementation programs should be initiated and/or continued for

populations identified as being at imminent risk of extinction, facing severe inbreeding depression or facing demographic risks."

The Johnson Creek Artificial Propagation (JCAPE) project proposes to increase the survival of summer chinook salmon in Johnson Creek by increasing egg to smolt survival through hatchery incubation and rearing (80% survival) as compared to wild/natural incubation and rearing (10% survival). Enhancement to listed summer chinook is expected by providing the benefits of increasing adult returns through the use of acclimated juvenile releases. Artificial production under this program is through conventional and captive brood techniques.

The Nez Perce Tribe is primarily responsible for operating supplementation facilities (adult collection and holding and juvenile acclimation and release) on Johnson Creek. IDFG is responsible, in coordination with the Nez Perce Tribe, and USFWS for production and activities occurring at the McCall Fish Hatchery.

In addition to the potential benefits, the co-managers acknowledge that supplementation programs also have potential risks associated with them (Cuenco et al. 1993, Waples 1995, Steward 1996). A comprehensive monitoring and evaluation program to assess effectiveness and provide information to manage associated risks of the supplementation program is an integral part of the JCAPE. The Nez Perce Tribe is responsible for monitoring and evaluation activities in Johnson Creek.

b. Rationale and significance to Regional Programs

The Johnson Creek Artificial Propagation Enhancement project, is part of a cooperative project between NPT, IDFG, and USFWS (LSRCP program) and is one of the high priority Tribal supplementation projects that has been around since the Early Implementation Plan (EIP) process through the Bonneville Power Administration. It has received a high priority ranking through CBFWA and has been reviewed and recommended through the *U.S. v Oregon* Production Advisory Committee process. NMFS has deemed the project as critical to recovery of ESA-listed salmon (Stelle 1996). Additionally, this program has undergone intense scrutiny and review through the NMFS ESA Section 10 Application process and an Independent Scientific Review through the NPPC 3-Step Process.

NMFS (1995) suggests revising rearing and breeding techniques to improve the quality of smolts, and manipulating water temperatures and diets to emulate natural growth. Studies conducted at their Manchester Lab (Maynards et al 1996) suggests that decreasing rearing densities, using acclimation ponds and voluntary release strategies, and incorporating shade, substrate, cover, structure in rearing containers can increase post-release survival by making fish more like their wild counterparts. The JCAPE project, a NATURE's concept supplementation program, is designed to preserve and recover chinook salmon in Johnson Creek. This project is in place, in kind mitigation. Supplementation under this project is planned for a minimum of five full salmon generations or 25 years.

Activities associated with the JCAPE have been authorized under ESA Section 10 and Section 7 Permits and Biological Opinions. These documents include ESA Section 10 Permit No. 1147, Permit No. 1164, FWS Section 7 Biological Opinion 501.1100,1-4-98-F4 (bull trout), ESA Section 10 Applications (Lothrop 1998), NMFS Section 10 Biological Opinion (1998).

The JCAPE project relates to many of the Columbia Basin Fish and Wildlife Program (FWP) objectives and measures (NPPC 1994). Measure 7.2D.1, encourages incorporating effective husbandry practices and Measure 7.2D.3 includes the investigation of hatchery rearing operations and release strategies to improve survival of propagated fish. In addition, this project furthers development of FWP Measure 7.4D (Captive Brood Stocks), 7.4F (Portable Facilities for Adult Salmon Collection and Holding, and for Juvenile Salmon Acclimation), and 7.4O (Small-Scale Production Projects). The monitoring and evaluation research outlined in this proposal relates directly Measure 4.2 (Salmon and Steelhead Research and Evaluation). Furthermore, Measure 7.1B (Conserve Genetic Diversity) stresses the need for evaluating the genetic and ecological impacts of outplanting hatchery fish on wild populations. Finally, Measure 7.4 (D) (3) encourages the study of hatchery rearing and release strategies to improve survival and adaptation of cultured fish.

Additionally, this project relates to the Snake River Recovery Plan (NMFS 1995): 4.1.b, 4.4c. A...develop and implement management plans for Snake River spring/summer chinook salmon conservation hatchery programs…" and "The fisheries agencies and Tribes should design and carry out production-scale experiments at appropriate Columbia River Basin hatcheries to test individual release strategies and evaluate smolt quality indices believed to improve smolt quality. The fisheries agencies and the Tribes should develop methods of achieving high quality fish…using acclimation ponds and volitional release strategies". The Recovery Plan also calls for genetic studies, evaluations of release strategies, and the development of smolt quality indices, all of which should accompany supplementation projects. These recommendations are addressed in the monitoring and evaluation (M&E) objectives outlined in this proposal.

Wy-Kan-Ush-Mi Wa-Kush-Wit: Volume I: 5B–14-22; Volume II: 2-118-127. "Implement supplementation projects that have met the screening criteria of RASP (1992) and Cuenco et al (1993)", which includes Johnson Creek. "Establish additional programs for each of the subbasin tributary systems to monitor adult escapement and resulting smolt production, and to evaluate (by measuring the number of adults returning) the ability of managers to meet goals set by the Columbia River Management Plan." It is also recommended that the Johnson Creek project release up to 300,000 smolts annually to assist in rebuilding runs of anadromous salmonids in the Columbia River subbasins.

The Salmon River Subbasin Plan: Objective 5: states "Supplement where needed with genetically appropriate salmon and steelhead in the subbasin using stock specific escapement criteria capable of maintaining stock productivity, survival, and genetic diversity." It further lists the Johnson Creek project as a strategic approach to "Supplement naturally spawning populations with local broodstock to enhance natural production".

c. Relationships to other projects

IDFG and USFWS are intimately involved in the coordination and implementation of this project. Rearing of the Johnson Creek fish will be occurring at the McCall Fish Hatchery, a USFWS – LSRCP facility operated by the IDFG. Johnson Creek production, occurring in the proposed new facilities at the McCall Fish Hatchery, will be integrated with the existing production under the LSRCP program.

Monitoring and Evaluation projects identified in the NPPC's FWP (NPPC 1994) that will complement this proposal are: 8909800 - Idaho Salmon Supplementation Monitoring (IDFG); 8909802 - Salmon Supplementation Studies in Idaho (NPT); and 9703800 – Listed Stock Gamete Preservation – Cyropreservation (NPT). The Johnson Creek project will serve as a treatment stream for the ISS studies. M&E data collection efforts will be cooperative to suit the needs of these other ISS projects. The Johnson Creek project will use cyropreservation as a genetic conservation measure tool.

U.S. Forest Service, Boise National Forest, is the primary land management agency where many of the supplementation and monitoring and evaluation activities will occur. They will be involved in the preparation and review of the necessary environmental documents and permits required to conduct these activities on National Forest System lands. Portions of the field operations are located on or near private land. This requires coordination with several private land owners in the Johnson Creek area.

d. Project history (for ongoing projects)

Major Results Achieved

This project began in 1996 with initial planning, environmental analysis, addressing ESA requirements, personnel hiring, equipment acquisition, and the development of portable adult collection and holding and juvenile rearing and acclimation facility needs for Johnson Creek and the McCall Fish Hatchery. It was determined that the McCall Fish Hatchery did not have adequate rearing space to meet the intended production needs of the JCAPE project. The McCall Fish Hatchery is able to rear less than 100,000 additional smolts when they are below thier annual production level. To meet the intended production goal of up to 300,000 smolts the JCAPE project needs to construct additional rearing facilities (egg incubation,

early rearing and smolt rearing) at the McCall Fish Hatchery. Facilities on Johnson Creek are necessary to the conduct adult collection and holding and smolt acclimation phases of the project.

In 1998, NEPA analysis was initiated on all project activities, preliminary engineering design was started for all facilities, and ESA permits were secured for adult collection and juvenile monitoring. Project activities were authorized through the NPPC's 3-Step process in July 1998. This partial Step 2 approval allowed for the collection of adult broodstock to begin before completion of facility design. Final Step 2 review by the NPPC is expected in April 1999. Adult trapping and spawning began in 1998. A total of 32 females were spawned with 85,000 eyed eggs being incubated at the McCall fish hatchery where they be reared until March of 2000.

Monitoring and evaluation activities have also been conducted since project inception. A detailed monitoring and evaluation plan for this project was prepared (Vogel et al 1998, draft). The plan will be used as an adaptive management tool and to gauge the effectiveness of the program relative to its purposes. Juvenile screw trap operation was initiated 1998 to collect juvenile chinook for baseline information (life history characteristics) and to PIT tag juvenile chinook to determine survival estimates. Adult monitoring continued on returing adults to Johnson Creek. In 1998, adult escapement was monitored by weir capture and indirectly by multiple redd count/carcass surveys above the weir. All data for juveniles and adults (effeciecy of weir, biological information, redds, carcasses, etc.) will be analyzed and summarized in the 1998 annual report.

Reports and Technical Papers

1) 1997 and 1998 Quarterly Reports for BPA
2) JCAPE Monitoring and Evaluation Plan (Vogel et al 1998 draft) - Details data collection procedures on life history information, baseline population assessment prior to supplementation, ecological interactions, genetics, fish health, adult returns, spawning ground surveys, juvenile releases, juvenile outmigration, and survival interactions.
3) JCAPE Broodstock Management Plan (Mavros et al 1998 draft) - Details production goals and objectives, broodstock acquisition through use of a sliding scale, spawning matrix, and genetic conservation strategies.
4) JCAPE Annual Operations Plan (Daniel and Gebhards 1998 draft) - Details weir operation, spawning protocols, incubation strategies, NATURE's rearing programs, release strategies, pathology, and facility operation and maintenance.
5) Section 10 ESA Application Permit (Lothrop 1998)
6) Preliminary Environmental Assessment (BPA 1998)
7) Biological Criteria Report (FishPro 1998)
8) Preliminary Design Report (FishPro 1998)

Adaptive Management Implications

Production for this project is intended to incorporate NATURE's concepts into a conventional supplementation program. The co-managers have attempted to design a program that will use conventional production to increase numbers of natural spawners at low levels of abundance and produce a balance between natural and hatchery production at higher levels of natural spawner abundance. This will be accomplished through the use of a broodstock management tool called the "sliding scale." This sliding scale is detailed and discussed in the Section 10 Permit Application (Lothrop 1998).

Past Costs

1996: $169,525; 1997: $691,483; 1998: $1,058,386 (Supplementation) + $241,614 (M&E); 1999: $1,024,501 (Supplementation) + $275,499 (M&E); 2000: $2,482,000 (Supplementation) + $318,000 (M&E) (scheduled).

e. Proposal objectives

JCAPE Program Goal: Prevent extinction of summer chinook salmon in Johnson Creek and ensure a high probability of population persistence once the causes of basin wide declines have been addressed.

Supplementation Goal: Operate and maintain adult collection and juvenile acclimation and release facilities on Johnson Creek and egg incubation and juvenile rearing facilities at the McCall Fish Hatchery. These facilities are necessary to implement the JCAPE program and achieve the overall goal rearing 300,000 smolts to obtain a minimum spawner escapement of 250-300 adults.

M&E Goal: Establish baseline information on the Johnson Creek summer chinook salmon population prior to supplementation. Monitor and evaluate the effectiveness of supplementation to aid in the recovery of the natural population of Johnson Creek summer chinook.

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Objective 1. Johnson Creek Artificial Propagation Enhancement Project Coordination.

Objective 2. JCAPE Facility Construction Implementation.

Objective 3. Collect baseline information on environmental conditions in Johnson Creek, with special attention to smolt emigration and adult spawning migration periods.

Objective 4. Determine abundance, selected life history characteristics/patterns, and spatial distribution of juvenile summer chinook salmon pre-, during, and post-supplementation of indegenous summer chinook salmon.

Null Hypothesis 1: Implementation of the Johnson Creek Artificial Propagation Enhancement (JCAPE) Program has not significantly increased summer chinook smolt production in the Johnson Creek system.

Null Hypothesis 2: Implementation of JCAPE has not significantly altered the life history patterns of summer chinook salmon in the Johnson Creek system.

Objective 5. Adult Salmon Collection, Holding, and Spawning.

Objective 6. Determine abundance and spawning distribution/success of upstream migrant jack and adult summer chinook salmon pre-, during, and post-supplementation of indigenous summer chinook salmon in the Johnson Creek system.

Null Hypothesis 1: Implementation of the Johnson Creek Artificial Propagation Enhancement (JCAPE) Program has not significantly increased the number of summer chinook spawning in the Johnson Creek system.

Null Hypothesis 2: Implementation of the JCAPE project has not altered run timing and spawner distribution in the Johnson Creek system.

Objective 7. Determine and monitor genetic characteristics/patterns, of supplementation vs. natural summer chinook salmon pre-, during, and post-supplementation of indegenous summer chinook salmon.

Null Hypothesis: Implementation of the Johnson Creek Artificial Propagation Enhancement (JCAPE) Program has not significantly alterted within-population genetic variation of endemic summer chinook in the Johnson Creek system.

Objective 8: Evaluate operation of the adult collection and holding facility for adverse impacts to resident and/or anadromous fish populations in Johnson Creek.

Null Hypothesis 1: Presence of the adult holding facility does not have a significant impact on run timing, spawner distribution, and survival of adult summer chinook salmon returning to Johnson Creek.

Null Hypothesis 2: Presence of the adult holding facility does not have a significant impact on movements and survival of resident fishes.

Objective 9: Egg Incubation and Juvenile Rearing.

Objective 10: Monitor smolt production in the hatchery to evaluate health status, growth rates, condition factors to compare supplemented fish with natural fish in Johnson Creek.

Null Hypothesis: Overall hatchery product is not significantly different than natural chinook in Johnson Creek.

Objective 11: Smolt Acclimation and Release.

Objective 12: Determine effectiveness of acclimation of hatchery reared summer chinook salmon to increase the overall population of Johnson Creek summer chinook salmon.

Null Hypothesis 1: Smolt acclimation facilities has not significantly increased numbers of hatchery smolts leaving Johnson Creek.
Null Hypothesis 2: Spring emigration timing to Lower Granite dam of acclimated smolts is not significantly different to naturally produced smolts.
Null Hypothesis 3: Acclimated smolts do not have a significantly different smolt to adult survival rate than wild or naturally produced smolts.
Null Hypothesis 4: Spawner distribution, sex ratios, and age of return is not significantly different for adult fish returning from acclimated groups compared to wild or naturally produced groups.

f. Methods

Objective 1. Johnson Creek Artificial Propagation Enhancement Project Coordination.

Program coordination involves the following activities: engineering design, construction, monitoring and evaluation, research, and fish culture. In addition, there are many entities involved in the project and their participation over the next several years will be crucial. Funding and oversight is through BPA. Besides the NPT and BPA, other entities invovled in the project include IDFG, USFWS, NMFS, NPPC, CBFWA, CRITFC, USFS, and several private landowners on Johnson Creek. Report preparation and presentations are a vital element of evaluation and coordination of the JCAPE project.

Objective 2. JCAPE Facility Construction Implementation.

The JCAPE project has identified the need for several facilities to assist in meeting the goals and objectives of this project. These facilities include: Adult collection and holding facilities on Johnson Creek; additional egg incubation and juvenile rearing at the McCall Fish Hatchery; and smolt acclimation facilities on Johnson Creek. Final design for juvenile acclimation, adult collection and holding, and juvenile rearing facilities will incorporate the biological needs and NATURE's concepts for the JCAPE project into each facility. Monitor construction to determine that NATURE's biological criteria, as established in Final Design, are being met. Particiate, with BPA and Construction Manager, in oversight of facility construction at McCall Fish Hatchery and Johnson Creek. Provide for cultural resource mitigation during construction of facilities. Value engineering will be utilized to help identify cost savings. Construction of all facilities on Johnson Creek and at the McCall Fish Hatchery is anticipated to begin in 2000.

Objective 3. Collect baseline information on environmental conditions in Johnson Creek, with special attention to smolt emigration and adult spawning migration periods.

Monitor constant recording temperature thermographs and river staff gauge height to collect water temperature and stream flow information. A USGS gauging station (at the confluence of Johnson Creek

and the East Fork South Fork Salmon River) has been collecting discharge (cfs) and staff height data since 1928. During the smolt trapping (March through November) personnel record the staff gauge reading one to two times daily.

Objective 4. Determine abundance, selected life history characteristics/patterns, and spatial distribution of juvenile summer chinook salmon pre-, during, and post-supplementation of indegenous summer chinook salmon.

Operate emigrant rotary screw trap daily to sample the spring, summer, and fall emigration periods (March through November). Trap will be operated until weather conditions, icing conditions, prohibit effective functioning of the trap. The JCAPE M&E plan (Vogel et al. 1998) details the methods to be used.

This trap should allow us to quantify population characteristics/status at several juvenile life history stages: emigration (spring, summer, fall) from Johnson Creek (natal stream) and survival and timing of smolt movement past the lower Snake River dams. Supplemental summer parr tagging and snorkeling of general parr monitoring sites (GPM), coordinated with IDFG, will be conducted to obtain summer parr survival estimates and movement patterns. Summer parr will be captured using beach seines and minnow traps and trend information on presence/absence completed by snorkeling GPM sites.

Sample size requirements for determinating survival to Lower Granite and McNary dams are estimated using the SURPH.1 (Smith et al. 1994) SAMPLE_SIZE program. Desired precision levels are established as 95% confidence intervals within ∀5%. Using observed survival and detection probability rates from recent hatchery releases within the Snake River basin estimated minimum release groups of 800 (Lower Granite Dam) and 7500 (McNary Dam) smolts PIT tagged smolts (or smolt equivalents) will be required. Sample sizes to obtain juvenile life history (timing and distribution) data are based on obtaining 50 (30 minimum) individual observations at Lower Granite Dam. Sample size will be adjusted as specific survival data from the South Fork Salmon River and Johnson Creek becomes available.

Arrival timing and survival will be analyzed using PTAGIS databases and the SURPH model. Parr movement and survival will be analyzed using recaptures at the Johnson Creek screw trap in addition to all other traps and movement through the dams using the PTAGIS databases. The JCAPE M&E plan (Vogel et al. 1998) details the methods to be used.

Objective 5. Adult Salmon Collection, Holding, and Spawning.

A portable weir and trap unit consisting of tripods, picket panels and an adjustable trap/holding box installed approximately five miles upstream from the mouth of Johnson Creek, and will be utilized to collect adult summer chinook salmon. Protocols for operation of the Johnson Creek trapping facility will follow basic adult trapping and handling procedures consistent with IHOT guidelines (1995) and the JCAPE Annual Operating Plan. The weir/trap will be monitored 24 hr a day and routinely checked for accumulation of debris and proper operation. Design of the weir allows for unimpeded upstream and downstream movement of juvenile fish. As well as controlled movement of adult sized fish.

Captured adults will be sampled at least daily. Until adult holding ponds are available on Johnson Creek, adults selected for broodstock will be transferred to a transportation vehicle and transported to the LSRCP South Fork Salmon River adult holding facility (45 miles away). Adults for natural spawning will be released upstream of the weir following recovery from anesthetic. Only a portion of adults of natural or conventional hatchery origin will be retained for broodstock. These portions are detailed in the JCAPE Broodstock Management Plan (Mavros et al 1998, draft). The level of take or number of adults necessary to implement the conventional production component is based on a sliding scale (Lothrop 1998). The maximum number of adult salmon needed to meet a supplementation objective of up to 300,000 smolts would be 228 (114 females) adult salmon (this assumes a 50:50 sex ratio; 15% pre-spawning mortality; 96

females spawned; average fecundity of 4500 eggs/female) with an estimated green egg take of 432,000 (FishPro 1998). 1998 represented the first year of adult collection.

There are several risks associated with any supplementation project. These risks include, but are not limited to: decreases in genetic variability; increased incident of disease transmission; loss of animals because of stress, lack of water supply or other mishaps; change in the age composition of the spawning cohort.

Objective 6. Determine abundance and spawning distribution/success of upstream migrant jack and adult summer chinook salmon pre-, during, and post-supplementation of indigenous summer chinook salmon in the Johnson Creek system.

Wild, natural, and supplementation produced adult chinook salmon will be trapped in Johnson Creek approximately five miles upstream of the confluence with the East Fork South Fork Salmon River. The trapping facility will be operated daily throughout the upstream migration period. The JCAPE Annual Operations Plan (Daniel and Gebhards 1998, draft) details the methods to be used. An external opercle tag will be used in a Peterson mark-recapture study (Krebs 1989) to test the efficiency of the weir and to obtain total migration numbers for Johnson Creek. Multiple pass redd count/carcass count survey (Schwartzberg 1987) will be utilized to determine total escapement above the weir, hatchery to wild fish ratios, and fish per redd.

Total escapement above the weir will be based on number of adults released above the weir and using a mark-recapture study (Krebs 1989). The JCAPE M&E plan (Vogel et al 1998, draft) details the methods to be used. Total escapement above the weir for 1998 was calculated and we determined that the portable weir needed improvements to increase effectiveness of the weir. We anticipate 80-100% efficiency in the 1999-2000 trapping seasons.

Johnson Creek is a treatment stream under the Idaho Salmon Supplementation study. This study will utilize information taken from other systems in the subbasin (Secesh and South Fork Salmon Rivers) to evaluate relative abundance of upstream and downstream migrations, spawning escapement, and dispersion rates. Those studies (ISS and Underwater Video Monitoring) will also help us quantify straying of Johnson Creek fish to those nearby systems.

Objective 7. Determine and monitor genetic characteristics/patterns, of supplementation vs. natural summer chinook salmon pre-, during, and post-supplementation of indegenous summer chinook salmon.

Remove tissue sample from fish collected during carcass survey for protein electrophoresis. Protein electrophoresis will be used to analyze allelic differences among the JCAPE chinook population and to compare to the electrophoresis study conducted by NMFS during 1989 and 1990 (Waples et al. 1990). Fin clips obtained from fish captured at the adult weir will be used for DNA analysis. We will use mitochondrial DNA restriction fragment length polymorphisms (RFLPs), nuclear gene RFLPs of growth hormones and p53 gene introns, and microsatellite DNA using redesigned primers for PuPuPu and Om77 to determine each individual salmon genotype. These three types of DNA cover the gamut of conserved and variable regions in both mitochondrial and nuclear DNA (Powell 1998, personal communication). Other DNA-based techniques, particularly microsatellite marker development and/or other methods of DNA sequencing of mitochondrial DNA and internal transcribed spacer regions (ITS) will be reviewed to see which techniques produces the best for monitoring genetic and life history traits in wild and supplemented populations.

Genetic research requires systematic sampling of several populations or subpopulations for several generations to address the research goals of characterizing genetically based measures for which supplemented and wild fish can differ and identifying ways to minimize this differentiation. These

experiments are a critical step in answering unresolved questions about the genetic effects of supplement fish and form a foundation upon which management strategies will be based.

Objective 8. Evaluate operation of the adult collection and holding facility for adverse impacts to resident and/or anadromous fish populations in Johnson Creek.

Upstream and downstream observations (ground and snorkeling) of the adult weir are done daily and the presence of any anadromous or resident fishes are recorded. If the same fish is located in three subsequent sampling periods, corrective action (alter the weir to allow fish passage) will be taken. The JCAPE M&E plan (Vogel et al. 1998) details the methods to be used.

If fish impedence is observed based on protocol results, the adult weir may be modified and/or partially removed to accommodate the passage of impeded fishes. In extreme cases (extremely small adult return years, large numbers of impeded fish) the entire weir may be removed to allow movement of these fishes.

Objective 9. Egg Incubation and Juvenile Rearing.

Eggs collected from Johnson Creek adults are transferred to the McCall Fish Hatchery where they will be incubated. The progeny are reared at the McCall Fish Hatchery until they reach smolt stage. Juveniles would then be transferred to acclimation facilities on Johnson Creek in early spring. The first group of 85,000 eggs for the JCAPE project were brought to the McCall Fish Hatchery in 1998. These fish will be ready for release in early 2000.

Where feasible and economical, the JCAPE project will be applying NATURE's rearing concepts (Maynard etal 1996) to standard fish culture practices for the McCall Fish Hatchery. Evaluation of these techniques will be coordinated through the JCAPE M&E program.

Treatment will primarily consist of the rearing up to 300,000 summer chinook smolts, for acclimated release back into Johnson Creek. Production of up to 300,000 summer chinook salmon smolts, for final rearing/acclimation into Johnson Creek, was calculated from the following survival rates (these rates are the same as those achieved at the McCall Fish Hatchery, where most of the rearing will occur): 80% Egg to Fry Survival; 90% Fry to Smolt Survival.

Objective 10. Monitor smolt production in the hatchery to evaluate health status, growth rates, condition factors to compare supplemented fish with natural fish in Johnson Creek.

Monitoring of salmon hatchery production reared under the NATURE's rearing program allows for a measure of comparison across years. Collection of biological data during the rearing process assists proper evaluation of the hatchery product used in supplementation. An identifying group mark is required of hatchery fish by *US vs Oregon*. Mark type will be coordinated by co-managers to ensure compatibility with other programs. Rearing and release strategies can then be evaluated according to smolt emigration survival and adult return. Estimates of marking efficiencies/retention rates prior to release will be taken. Survival of smolt releases to Lower Granite, Little Goose, Lower Monumental, and McNary dams using the SURPH.1 model will be estimated. Determine smolt size influence on downstream survival. Compare acclimation release stategies for smolt to adult survival. Evaluation will also include a genetic assessment to ascertain if breeding protocol is maintaining wild stock genotypic characteristics. If deviations are identified between supplemented and natural chinook salmon a modification in the rearing of supplemented fish will be implemented to more closely mimic natural fish.

Objective 11. Smolt Acclimation and Release.

The JCAPE project will be acclimating all supplementation fish using natural stream side channels or earthen ponds (to be constructed in 1999 or 2000). The acclimation facilites will be gravity fed from

Johnson Creek. Protocols for operation of the Johnson Creek acclimation facility will follow basic juvenile acclimation procedures consistent with IHOT guidelines (1995) and the JCAPE Annual Operating Plan. The facility will be staffed 24 hours a day during the four to six week acclimation period. Smolts would be transferred into these facilities from the McCall Fish Hatchery beginning about March 1st and would be held for a minimum of 21 days, after which time they would be allowed to volitionally release. All fish would be released from these facilities by April 15th.

Objective 12. Determine effectiveness of acclimation of hatchery summer chinook salmon to increase the overall population of Johnson Creek summer chinook salmon.

All supplemented fish will be administered with a coded wire tag (CWT) (PMFC 1983; Blankenship 1990) and visual implanted tag (Haw et al. 1990; Kincaid & Calkins 1992; Frederick 1997) to evaluate recovery rates of releases, compare life history characterics, broodstock management, survival rates, and emigration timing. Smolts will be released from acclimation facilities on Johnson Creek beginning in spring of 2000. PIT tagged groups will be used to evaluate: time of release, release location, emigration survival and timing, travel time, and size at release.

Sample size requirements for determinating survival to Lower Granite and McNary dams are estimated using the SURPH.1 (Smith et al. 1994) SAMPLE_SIZE program. Desired precision levels are established as 95% confidence intervals within ∀5% of the survival estimate. Using observed survival and detection probability rates from recent hatchery releases within the Snake River basin estimated minimum release groups of 800 (Lower Granite Dam) and 7500 (McNary Dam) PIT tagged smolts (or smolt equivalents) will be required. Sample sizes to obtain juvenile life history (timing and distribution) data are based on obtaining 50 (30 minimum) individual observations at Lower Granite Dam.

Release sites will record (by using PIT tagged fish) time of release and release location. Screw trap and the lower Snake River dams will capture and record emigration timing, and travel time. Arrival timing and survival, for each of the above systems, will be analyzed using PTAGIS databases and the SURPH model.

After initial releases of supplemented fish are analyzed, adjustments could be made to the rearing of supplemented fish, to more closely mimic wild fish if deviations of size, location, emigration timing, and travel time.

g. Facilities and equipment

The Johnson Creek project is primarily conducted out of the Nez Perce Tribe=s field office in McCall, Idaho. This office currently houses NPT Fisheries and support personnel from three other BPA funded projects. At this time, the office facilities are adequate for all administrative and personnel needs. The Johnson Creek project has adequate computer power with six desktop systems and two notebook computers for field operations.

Field operations located on Johnson Creek (65 miles East of the McCall office) consist of a portable adult weir and trap, juvenile rotary screw trap, travel trailers, and other support equipment and vehicles. These facilities and equipment have been adequate for field operations during the initial stages of the project. Johnson Creek juvenile chinook raised at the McCall hatchery will be CWT tagged, VIE tagged, and PIT tagged before they are transported to the acclimation facilities. Tagging equipment needs will be met through existing equipment or shared equipment through the Nez Perce Tribe.

The following facilities are necessary for the long term operation of the project: Onsite adult holding and spawning facilities are needed on Johnson Creek. These facilities will eliminate the need to transport adult fish from Johnson Creek to the McCall Fish Hatchery facility on the South Fork Salmon River (45 miles), reducing stress on these fish and increasing adult and egg survival. A long term adult weir and trap site needs to be established that is adjacent to the adult holding and spawning facilities. Additional support

facilities such as secure storage facilities, electrical service, a domestic and fish water supply, and waste facilities (septic system and refuse disposal) are needed at the same location as the adult trapping, holding and spawning facilities. Smolt acclimation facilities are needed on Johnson Creek to achieve a significant objective of the project. These facilities will be natural earthen channels or ponds that will hold up to 300,000 smolts for acclimated spring releases. The McCall Fish Hatchery does not have adequate rearing space to meet all of the production needs for the JCAPE project. These new facilities would allow for the application of NATURE's rearing techniques to the Johnson Creek fish and to meet the anticipated rearing needs of the project.

h. Budget

Personnel – Includes five full-time employees, four 9-month temporary tecnicians, office manager (11 pay periods), overtime pay for 9 people (6 pay periods), and administrative support which includes program manager, contract administrator, and research coordinator.

Fringe benefits - Includes 24.% for the full-time employees and adminstrative support and 14.0% for the technicians.

Supplies, materials, non-expendable property - Trap materials, lumber, screw trap rigging, waders, packs, uniforms, gloves, chemicals (argentyne, MS-222, etc), and office/computer supplies and postage.

Operations & Maintenance - Rent, utilities (for both office and field trailer), equipment maintenance (screw trap replacement parts and materials and PIT tagging station & tagging replacement parts and materials), fish hatchery expenses, and equipment leases.

Capital Acquisitions or Improvements - $1,930,546 – Covers construction costs of acclimation and adult holding facilities on Johnson Creek and improvements to the McCall Fish Hatchery.

NEPA Costs - Covers the cost of additional NEPA analysis.

Construction-related Support - $142,500 – Includes final engineering design, site mapping and geo-technical surveys, and cultural resource review.

PIT tags - 18,000 PIT will be used to evaluate smolt to adult (SAR) survival of wild juvenile chinook emigrating out of Johnson Creek and supplementation fish, which will be PIT tagged into 2-3 acclimation groups.

Travel - Covers GSA related expenses for five project vehicles and one fish truck. Also includes per diem for 9 employees for the entire field season as well as funds for personel to attend meetings, conferences, training, etc.

Indirect costs - The Nez Perce Tribe indirect costs rate is 22.9% of all categories above except subcontractor services and PIT tags.

Subcontractor - Includes all mass marking of supplementation of fish (CWT tagging, PIT tagging, and VIE tagging), fish sample analysis (scale, otolith, and genetic analysis), and helicopter flights (for redd/carcass counts), and contracted project analysis and writing.

Section 9. Key personnel

John S. Gebhards, JCAPE Project Leader (1 FTE)
Nez Perce Tribe Department Fisheries Resources Management

EDUCATION
B.S. in Geology, University of Puget Sound, 1988

20 hours Graduate Fisheries Courses, University of Idaho, 1991-1993

TECHNICAL EXPERIENCE
Project Leader, Nez Perce Tribe, McCall, ID, May 1997 - Present.
Project: Johnson Creek Artificial Propagation Enhancement Project
Biological Scientist, US Forest Service, Rocky Mountain Research Station, Boise, ID, Jan 1995 - April 1997.
Project: Fisheries Technology Transfer Group, Regions 1 and 4
Biological Scientist, USDA Forest Service, Payette National Forest, McCall, ID, May 1989 - Dec 1994.
Project: Krassel Ranger District=s Biological Monitoring Leader
Biological Technician, Idaho Department of Fish and Game, McCall, ID, May 1984 - April 1989.
Project: McCall Fish Hatchery Summer Chinook Spawning and Rearing

Duties: project implementation, management and coordination, budget preparation and management, contract and subcontract preparation and management, report writing, personnel supervision, tribal representative in meetings with IDFG, NMFS, BPA, NPPC, USFWS, CBFWA and private consultanats and landowners, data analysis, computer modeling, public speaking and presentations, and proposal development.

Skills: spawning adult salmonids, fish culture activities, field data collection and laboratory analysis of fresh water benthic macroinvertebrates and fish, boat electrofishing, back pack electrofishing, seining, gill netting, screw trapping, adult weirs and traps, hook and line, transect stream survey methodology, snorkel, redd surveys, life history research, diet analysis, water chemistry analysis, mapping, reach descriptions, GPS, GIS, database analysis, fish handling and identification, boat operation and maintenance, PIT tagging.

Jason Vogel, JCAPE Monitoring and Evaluation Project Leader (1 FTE)
Nez Perce Tribe Department Fisheries Resources Management

EDUCATION
Bachelor of Science, Major in Fishery Resources, University of Idaho, 1995
Master of Science, Major in fisheries, Utah State University, 1998

TECHNICAL EXPERIENCE
Project Leader, Nez Perce Tribe, McCall, ID, Apr 1998 – Present.
Project: Johnson Creek Artificial Propagation Enhancement Monitoring & Evalutaion Project
Graduate Research Assistant, Utah State University, Logan, UT, Oct 1995 – Mar 1998.
Project: Development of a visual foraging model for salmonid predators.
Field Technician, University of Idaho, Moscow, ID, May 1994 – Sep 1994, May 1995 – Sep 1995.
Project: Food web study and species interactions on Lower Granite Reservoir.
Biological Assistant, Oregon Department of Fish & Wildlife, LaGrande, OR, Mar 1995 – May 1995.
Project: Anadromous smolt monitoring on the Grande Ronde River.
Laboratory Technician, University of Idaho, Moscow, ID, Dec 1994 – Mar 1995.
Project: Lab portion of food web study of Lower Granite Reservoir.
Teaching Assistant, University of Idaho, Moscow, ID, Aug 1994 – Dec 1994.
Project: Instructed laboratory sessions for a 400-level Ichthyology course.
Biological Aid, Idaho Department of Fish and Game, Nampa, ID, May 1993 – Aug 1993.
Project: Movements and habitat utilization of bull trout in the Rapid River system.
Biological Aid, Idaho Department of Fish and Game, Riggins, ID, May 1992 – Aug1992
May 1991 – Aug 1991,Apr 1990 – Nov 1990
Project: Idaho Power Chinook Salmon Hatchery.

Duties: project implementation, management and coordination, budget preparation and management, contract and subcontract preparation and management, report writing, personnel supervision, tribal representation in meetings with IDFG, NMFS, BPA, NPPC, CBFWA, and private consultants, data base

management, data analysis, computer modeling, public speaking and presentations, and proposal development.

Skills: screw trap coordination and implementaion, PIT tagging, spawning adult salmonids, fish culture activities, surgical implantation of ultrasonic and radio transmitters, ultrasonic and radio tracking fish, field data collection and laboratory analysis of fresh water benthic macroinvertebrates and fish, boat electrofishing, back pack electrofishing, seining, gill netting, adult weirs and traps, hook and line, transect stream survey methodology, snorkel, redd surveys, life history research, diet analysis, database analysis, fish handling and identification, boat operation and maintenance, teaching ichthyology labs, hydroacoustics, and scuba research diving.

William V. Mavros, JCAPE Assistant Project Leader (1.0 FTE)
Nez Perce Tribe Department Fisheries Resources Management

EDUCATION
M.Sc. in Zoology, University of Manitoba, 1993
B.E.S. in Environmental Studies, University of Waterloo, 1988

TECHNICAL EXPERIENCE
Research Scientist - Battelle Pacific Northwest National Laboratory.
Richland, WA. Feb 1993 - Sept 1998.
Project: Majority of projects focused on effect of hydroelectric operations on fisheries, salmonid DNA fingerprinting, Snake River GIS analysis, ADCP river velocity profiling, GPS habitat mapping, Instream Flow Methodology (IFIM), biological evaluation of Snake River drawdown, fish passage criteria, System Operation Review, resident fish modeling, chaos modeling of oceanic survival of salmon, benthos sampling, fish screen evaluations, underwater video systems, radio telemetry tracking, organizing fisheries conferences and workshops and aquatic science education programs.
Biological Consultant – Self-employed consultant Winnipeg, Maintoba, Canada. Nov 1991 – Jan 1993.
Project: Compiled fisheries life history data base and completed an Environmental Impact Assessment report on the Mackenzie River Basin for the Department of Fisheries & Oceans (DFO). Conducted a comparative analysis of fish passage through two Denil fishways on the Grand River, Ontario.
Biological Consultant - Private Business, Ottawa, Ontario, Canada June 1989 - Jan 1990.
Project: Conducted a risk assessment report for Fish Habitat Management (DFO) on the possible impact of effluents from industrial outfalls located adjacent to critical marine fisheries in Canada.
Research assistant - Fisheries & Oceans Canada, Ottawa, Ontario, Canada, May 1987 - Aug 1987
Project: Evaluated software pertaining to HEP and IFIM habitat simulation models.

Duties: Responsible for integrating production needs into the summer Chinook recovery and restoration program of the Johnson Creek Artificial Propagation Enhancement (JCAPE) project. Write proposals for funding. Coordinate project development, production and ESA issues with State, Tribal and Federal agencies. Contract supervision on JCAPE Fisheries Production projects.

Skills: Ten years of experience in environmental research, design, field work and monitoring background in whole ecosystem, multi-disciplinary research involving hydro-electric, limnological and fisheries projects. Eight years of experience with fisheries population genetics, electrophoretic techniques, fishway design, fish passage evaluation, habitat modeling and environmental education. Seven years of experience with Intergraph GIS, ArcView GIS, Trimble GPS, Instream Flow Incremental Methodology (IFIM), ADCP, radio telemetry and underwater video systems. Six years experience developing and overseeing contracts for various funding agencies. Eight years of experience supervising technical and professional fisheries staff.

Roy Edward Larson, Director of Production (.15 FTE)
Nez Perce Tribe Department Fisheries Resource Management, Lapwai, ID office

EDUCATION
M.S. in Veterinary Science, University of Idaho, 1972
B.S. in Agriculture, University of Idaho, 1970

R. Ed Larson is the Director of Production Services for the Nez Perce Tribe. Mr. Larson has over 20 years of professional experience as a fisheries mananger. He provides direction, supervision and management of NPT Fisheries Production program. Co-author Nez Perce Tribal Hatchery Master Plan and Imnaha Master Plan. Responsible for integrating production needs into the multi-species recovery and restoration program of the Nez Perce Tribe. Write proposals for funding. Coordinate project development, production and ESA issues with State, Tribal and Federal agencies. Contract supervision on NPT Fisheries Production projects.

Paul A. Kucera, Director of Biological Services (.1 FTE)
Nez Perce Department of Fisheries Resources

EDUCATION
Bachelor of Science, Major in Fisheries Management, Utah State University, 1975
Graduate Studies, Major in Fisheries Management, University of Idaho, 1984-1987.

Paul Kucera is the Director of Biological Services for the Nez Perce. Mr. Kucera has 23 years professional experience as a Fisheries Biologist in research, management and administration and is a Certified Fisheries Scientist through AFS. He has authored or co-authored seven peer-reviewed fisheries journal publications and over 40 project reports. He is responsible for technical program direction and administration of the Fisheries Research Division.

Dave Johnson, Production Coordinator (.2 FTE)
Nez Perce Tribe Department Fisheries Resource Management

EDUCATION
M.S. in Biology, Northern Arizona University, 1982
B.S. in Biology, Northern Arizona University, 1979

Dave Johnson is the Production Coordinator for the Nez Perce Tribe Fisheries program. Mr. Johnson has over fifteen years of experience conducting field work, and providing management direction on fisheries and watershed projects. He is responsible for developing departmental direction, project and budget development and coordination, contract and subcontract review, report writing, NEPA document preparation, personnel supervision, tribal representation in meetings with interagency quorums, and private consultants, public speaking and presentations.

Jay Hesse, Research Coordinator, (0.1 FTE)
Nez Perce Department of Fisheries Resources

EDUCATION
Bachelor of Science, Major in Fisheries, Michigan State University, 1992
Masters of Science, Major in Fisheries and Wildlife, Michigan State University, 1994
Jay Hesse is the Reasearch Coordinator for the Johnson Creek Artificial Propagation Enhancement Monitoring and Evaluation portion of this project. Mr. Hesse has five years professional experience as a Fisheries Research Biologist and as the Research Coordinator. He is responsible for the technical direction and supervision of fisheries research division projects, research coordination, and research representation at state and federal meetings.

Section 10. Information/technology transfer

Technical information will be distributed through quarterly and annual progress reports to Bonneville Power Administration, submittal of findings to scientific journals, LSRCP program review workshops, CBFWA Project Review Workshops, Section 10 Permit Reports, Biological Assessments, and Biological Opinions. Project cooperators meet regularly to exchange information and discuss project adaptations.

Congratulations!